2: Hauck et al. D,E-5 (1952-1954) 1958 AO7 Central Thai AO7
Bang Chan

SUMMARY

A general description is given of conditions in a
105 Siamese rice village, 1952-54, as they relate to food supply
26 and food habits. Activities at various seasons of the year
[22] are described. The heavy work seasons occurred during transplanting and harvest. In the dry season, many ceremonials and festivals were held in which food played an important role. Such occasions provided opportunity to "make merit" and add to one's prestige as did the regular offering of food to the priests, throughout the year. The relatively large financial obligations undertaken by those sponsoring ceremonies was a major factor in the economy of the village.

105 Food was mostly home produced and an important factor
262 in the standard of living was the number of productive hands
433 available. Rice was the first essential for any meal. Home milled rice was used, even in part, only by a minority of households. Fish, fresh or preserved, was the food next in importance to rice. Use of flesh foods other than fish was probably inhibited by Buddhist tenets which prohibit the taking of life, but some poultry, oxen, and other flesh foods
[235] were used. Nearly all of the families in Bang Chan raised
[433] chickens, and some raised ducks, but about 3/5 of all eggs
[244] produced were sold. Every family had some sort of kitchen garden, including banana trees and other plants, but spices
[245] and chili were much more commonly grown than vegetables and
[227] fruit. Swamp cabbage, the green leafy vegetable used most often, grew wild in the canals. A calendar of fresh foods commonly used in Bang Chan is presented.

[443] Cash expenditures for food were small. When canals were navigable, boat venders brought produce and during the busy work seasons farmers often bought fish as well as the usual foods: onions, garlic, limes, coconut, palm sugar and small amounts of vegetables.

[434] Many households increased their income by the sale of eggs, vegetables gathered from the canal and other items.
[178] Culture of tilapia and mushrooms, begun during the period of study, was undertaken by a considerable number of farmers between 1953 and 1955. Both enterprises were apparently regarded primarily as a supplementary source of cash rather than as a means of improving the home food supply, and both efforts had been largely if not entirely abandoned by 1957.

105 Preparation of some typical dishes, meal service and
264 techniques of eating are described. For adults, two meals a day were usual, except during the busy work seasons when a third meal might be eaten. Menus were similar for all. Two observations from records of school children were 1) that over 90% of them ate snacks, many of which were bought from venders on the school grounds. Sweets and fruit were the

221 132 243 244 245 262 434 503 796 871

Chart 1. SEASONAL CYCLE - BANG CHAN, THAILAND, 1953-54

	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Season	→ ←WET→							←COOL→		←HOT→		
Temperature (°C)[1]	30	29	28	29	29	28	26	25	25	28	30	30
Humidity, rel., %	77	80	81	81	80	78	74	70	70	65	66	67
Rainfall	---→ heavy		moderate	←heavy→		←light→			←negligible→			
Canals		rising			high	(floods)			lowering fast		low,dry	
Cultivation of Rice		plowing→ seedbed grown				growing	early var. mature					
			TRANSPLANTING				←HARVEST→					
School		vacation						vacation			vacation	
Cash available Source	cash in hand					←cash shortage→					cash in hand	
	rice					cash jobs→			main rice sale			
Fruit;vegetables	--→ ←new planting→								←annuals die→			
Fish: Supplies	ponds drained→								←ponds drained→			
Maturation			←many varieties→						←best varieties→			
Preserving	←much→		←moderate→						←most→			
Ceremonies	ceremonies→			←Buddhist Lent→						←ceremonies→		
Dietary survey	--→ ←Round I→			←Round II→				←Round III→		←Round IV→		

1. Mean temperatures and relative humidity estimated from charts for Bangkok and the central plain of Thailand (Bunnag and Dhararak, 1947). Mean monthly temperature range from 25-30°C corresponds to 77-86°F; diurnal variations are greater, averaging 18°F (10°C) in April and 22°F (12°C) in January.

244 Vegetables and Fruit. - Although kitchen-gardening has been encouraged by the Thai government, vegetables and fruit were grown in Bang Chan to a limited extent only. Every family had some sort of kitchen garden, but many edible plants which can be grown in the village were grown by relatively few families. The list of fruits grown in Bang Chan in 1948-49 (Sharp et al., 1953) included four times as many items as were grown by one or more of the 11 families that participated in the dietary study. The list of vegetables and spice plants grown or gathered by these families included 27 items, as compared to 41 listed by Sharp et al. Spices and chili were more commonly grown than vegetables and fruit.[1]

244 245 433 One affluent household whose food expenditures for 1949 were reported by Sharp et al., (1953, pp. 214-215) produced for home use, 125 kg. of palm sugar valued at 200 baht and 500 coconuts, valued at 450 baht. Home production of both of these was unusual. Few families in Bang Chan grew either sugar palms or coconut palms and expenditures for coconuts and palm sugar were usual. During the major flood of 1942, villagers noted that coconut palms survived whereas all other fruit trees were destroyed. After this, a number of farmers planted coconut palms, but they had not yet begun to produce.

361 311 351 In 1954, about 120 acres (300 rai) of the total of about 2800 acres (7000 rai) of land in the village were used for home sites and home gardens for 336 households. Individual home sites usually varied in area from about one-quarter to one acre, and were occupied by buildings, threshing floor and space for poultry as well as trees and garden space. Portions of this might be under water for several months of the year. Increased home production of fruit and vegetables would in many cases necessitate increasing the size of the home site by purchase, mounding or both. Ordinarily, increased land for the kitchen garden was obtained at the expense of some of the

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245 249 262 262 245 1. In a typical farm garden in Bang Chan one would find bananas growing, and a number of plants used for seasoning curry. Various kinds of chilies, lemongrass, bergamot, of which both rind and leaves are used, and galangal were grown by all families who participated in the dietary study. Both sweet and holy basil were commonly grown. Many families grew one or more varieties of gourds and of eggplant, some of which can be trained to grow on a tree or trellis. The inflorescence of the banana was also used as a vegetable. Leafy vegetables were not commonly cultivated but some families grew (2)phag (2)ka-(2)cheed, a green water plant, in gardens staked out at the edge of the canal, or in a pool, and some had trees, the leaves of which were edible. Swamp cabbage or (2)phag (3)bung grew wild along the edge of the canals and was the most commonly used green leafy vegetable. A few families grew guava, jujube, star gooseberry, Manila tamarind, mango and pineapple.

262 might provide clues to ways in which the diet may be improved.
128 Most of these items were included in lists given by Sharp et al. (1953)[1]. To those lists should be added the following items from our food records:

Green leafy and yellow vegetables: Leaves of bergamot, chili, morinda, onion, potato, pumpkin, (2)sa-(5)noo, and of the following trees: (2)ma-(1)dan, (4)khlyb[2] and West Indian pea tree; (2)kha-(1)cauaun flowers.

Other vegetables: flowers of leek and pumpkin, and Chinese or black truffle (water chestnut).

Fruits: Thai nutmeg and tomato.

Fresh foods other than fish: buffalo, duck, cobra, turtle and field rat.

128 At the end of Chart 2, sources of water for drinking and food
312 preparation have been included, not only because water is
271 properly considered a nutrient, but also because the water used in preparation of food may affect the wholesomeness of foods eaten raw or with little cooking.

271 Untreated water was the customary beverage with meals.
[64 Ordinarily no distinction was made in source of drinking water
[86 for children and adults although boiled water was given to mothers and infants to drink during the post partum rest
[158 period (Hauck, 1956). Occasionally a sick person would be given boiled water to drink; for example one man who said he was "a little sick" and "not working" was observed to drink
[272 hot boiled water from a thermos bottle. In 1955, Ralis[3] found that tea was seldom or never drunk by nearly 3/4 of the respondents. Less than 7% drank it frequently. Thus in Bang Chan no custom had grown up which would afford the general population with a measure of protection against infection from

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[114 1. See Sharp et al., 1953, pp. 193-196 for a list of 32
[136 fish known to be found in Bang Chan; pp. 293-294 for 34 fruits
[244 grown in Bang Chan, and p. 295 for 11 fruits known to be used
[245 but not grown there; pp. 296-298 for 41 vegetables grown in
[262 Bang Chan, and pp. 299-300 for 24 other vegetables used.

[824 2. (4)Khlyb was the term used in Bang Chan for an uni-
[852 dentified tree of the family Leguminosae. Its sweet tasting leaves were washed in boiling water to get rid of a bad odor, then were eaten with (4)nam (4)phrig, a chili sauce.

[114 3. Golden and Ralis, 1957, p. 57. The answers to:
[126 "Do you drink tea frequently, occasionally, seldom or never?"
[272 were: often, 22; occasionally, 68; seldom, 158; never, 85.

511 appeared to account in large part for the greater cash expenditures of some families than others. Thus Household 25, with the highest total and per capita cash expenditure for food among these 11 families, consumed a larger quantity of meat than others, and often bought beef, which was the most expensive item purchased. This household bought fruit, meat, and vegetables from venders almost every day. They said [554] [222] "Some do not pay money to buy food, but pick or get it from the canal or gardens --this family cannot live like that because they come from a rich family and cannot live on poor food, so most of the money goes for food." The husband said "I cannot work on poor food." In Group A, Household 12, which had the highest per capita food expenditure, had little home produced food. The wife, who went to Bangkok often, usually bought food when in town. Household 2, with a total cash expenditure for food higher than others, did not have pork or beef on survey days, but ate more (1)plaa (1)thuu, a sea fish which is purchased.

433 511 Home Production of Food. - In keeping with the general pattern in the community, the families surveyed produced most of their own food.

243 [545] 256 [262] Rice. - The hired laborer received rice as part of his pay, but all other families produced their own. Seven households used polished rice exclusively (Table 9). The only one to use home pounded rice in major part was Household 103. This family lived near a little canal which was dry in summer, so they were using home pounded rice when visited toward the end of March and in mid-July (Rounds IV and I). When the observer came in January (Round III), transportation of rice to the mill by boat was possible, but the family members had little farm work to do and were willing to spend some time milling rice. This family, which lived in the home-milling area (see p. 40), took rice to be milled only during the harvest season when they were busy, and the level of the canal was still high. The families which used home pounded rice in minor part did not live in the home-milling area, and apparently milled rice at home only when they were unable to get to the mill by boat.

244 [554] [245] Fruits and vegetables. - Although the Thai government has attempted to encourage kitchen gardening, few vegetables and fruits were produced by the families which cooperated in the dietary study (Table 10). All families grew bananas, and certain common ingredients of curries: chilies, bergamot, galangal and lemongrass. No other plants were grown by as many as half of the families studied.

222 262 Of the edible plants which grew wild, swamp cabbage was used by 7 families on 11 of the 44 survey days. Bamboo shoots, the white flowers of the West Indian pea tree and yellow (2)sa-(5)noo flowers were used by 3 families on one day each;

256 Table 9. Use of Home-milled and Polished Rice by Households
262 Participating in the Dietary Study

Group and Code No.	Round of Dietary Study[1]							
	I		II		III		IV	
	HM[2]	P[2]	HM	P	HM	P	HM	P
Group A								
2		x		x		x		x
12		x		x		x		x
67	x			x		x		x
103	x		x			x	x	
215		x		x		x		x
222		x		x		x		x
Total No.	2	4	1	5	0	6	1	5
Group B								
16	x		x			x		x
20		x		x		x		x
21		x		x		x		x
23		x		x		x		x
25	x			x		x		x
Total No.	2	3	1	4	0	5	0	5

1. For dates, see Table 7, p. 58.

2. HM and P stand for home-milled and polished rice respectively.

222 truffles were used as snacks on 2 occasions, and (1) bauaun,
262 (2) phag (2) tob, lotus stems and lotus seeds, the latter as a snack, were used once each. The two groups of families appeared to grow fruits and vegetables and to gather edible
244 wild plants to about the same extent. Two families, one in each group, raised mushrooms during the period when farm work was slack.

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245 Table 10. List of Edible Plants Grown by the Two Groups of Households Studied

Name of plant[1]	Number of Families	
	Group A	Group B
Green and leafy vegetables		
Basil	3	1
Bean, string	1	-
Chili	6	5
Coral[2]	-	1
(3)Khii-(2)leg[2]	1	1
(4)Khlyb[2]	-	1
(4)Ma-(1)dan[2]	2	1
Morinda	-	1
(2)Sa-(1)daw[2]	-	1
Other vegetables		
Bamboo	1	2
Calabash	3	1
Egg plant	2	1
Gourd	1	-
(2)Kha-(1)cauaun	1	-
Mushrooms, straw	1	1
West Indian pea tree[2]	1	1
Fruits		
Banana	6	5
Guava	1	1
Jujube	1	-
(4)Ma-(1)dan[2]	2	1
Mango	1	1
Manila tamarind	1	-
Star gooseberry	1	-
(2)Ta-(1)koo	-	1
Spice plants		
Bergamot	6	5
Galangal	6	5
Ginger	2	-
(2)Ka-(1)chaaj	1	2
Lemongrass	6	5

1. See list, Appendix C, p. 126 for botanical names.

2. Trees

[146] Eggs were eaten occasionally; pork and beef were bought in-
[262] frequently and in small amounts by some families. One family only, ate chicken; other meats eaten on survey days included buffalo, frogs, eels and field rats.

Vegetables. - More than three quarters of the estimated vitamin A value of these diets was provided by green and leafy vegetables, although the pale yellow sweet potatoes, eaten in quantity by one family in Group A increased the vitamin A from other vegetables substantially. The greater use of swamp cabbage, a wild aquatic plant by families in Group A, may be explained by the fact that more visits to this group occurred when the water level in the canals was relatively high. Families in Group B, however, used a greater variety
[263] of greens, especially leaves from a number of trees. For families in Group A, sweet basil contributed substantially to the vitamin A and riboflavin content of the diets, whereas families in Group B used this herb in trivial amounts for flavoring. No nutrient values were found for lemongrass, which was used regularly in substantial amounts for flavoring. Persons in Group B got a greater percentage of their calcium and iron from green than from other vegetables, whereas those in Group A obtained as much or more of these nutrients from other vegetables.

Nearly 3/5 of the ascorbic acid intake of Group A was provided by other vegetables as compared to 1/4 from green vegetables, whereas Group B obtained about equal amounts of ascorbic acid from green and other vegetables. Egg plants[1], calabash and white radish were most commonly used in quantity. Onion, garlic and dried chilies were used daily, but in smaller amounts. With the exception of one family which ate a large amount of sweet potato on one survey day, consumption of tubers, i.e. sweet potato and taro, was small and usually in the form of snacks eaten by children. Legumes were seldom eaten in Bang Chan. Two families had bean sprouts on survey days, and children occasionally ate mungbeans and peanuts as snacks.

Fruit. - Although technically a fruit, the coconut does not resemble fruits as a group in its contributions to the diet, hence coconut and other fruits are treated here as two sub-groups. Coconut meat, and its products, coconut milk and coconut cream (Appendix C, p.128), were used almost daily in the participating households. These coconut products contributed about 1/5 of the total fat of the diet, for Group A,

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[244] [252] 1. Many varieties of eggplant are grown in Thailand. Three were used on survey days: the pea-size variety which was frequently put in hot curry, a round type which was served raw with chili sauce and a long variety which was either panned with a small amount of fat or used in curry.

000 and conditions. An improved stove[1], by making more efficient
[351] use of fuel, would reduce one obstacle to boiling drinking water. The alternative, chemical treatment, might be regarded as "medicine," and people might be more willing to spend money for this than for firewood. Water supply and latrine facilities at the school and wat should be such as to set a good example. Since links between sanitation and health have not been established in the minds of the villagers, no proposed solutions are apt to be effective without a strenuous and continued educational campaign.

Since the nutrient content of many foods used in Bang Chan has not been ascertained, the responsible Thai government personnel should as soon as possible seek to analyze those more commonly used, in particular fish, fermented fish, shrimp paste, fish paste and fishsoy, both commercial and home-made products, edible green leaves and flowers. Discovery, among the many varieties of fish used, of some which are good sources
146 of vitamin A, would be particularly useful. Of the calculated vitamin A values in diets for the two groups of households studied 90% or more of the vitamin A value was from vegetable sources, therefore in the precursor form. Among foods of animal origin which were used, eggs were the only food known to contain appreciable amounts of vitamin A. With more, and more complete, analyses of Thai foods, some of unusual nutritive value would probably be discovered. Also, information on composition of coconut milk should permit reasonably accurate calculation if the weight of coconut meat and the resulting product are known. Use of figures now available in food value tables, for coconut milks as prepared in Bang Chan, would lead to gross overestimate of caloric value and fat content of diets.

000 In using present knowledge to improve nutrient intake, emphasis should be placed on changes which would improve the everyday diet for all members of the family. We would start with familiar foods and methods of preparation, stressing the types of food which should be produced and used in increasing amounts. Advice of specialists in agriculture at nearby Kasetsart University should be sought in making choices appropriate to the location, among vegetables which would enhance the nutrient content of the diet, particularly in vitamin A value
[247] and riboflavin. Since garden area is often limited, vine vegetables which can be trellised may be useful. In introducing innovations, we would, if possible, build on procedures known to be acceptable to some respected persons in the community.

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1. The "Hyderabad Smokeless Chula" would be useful in Bang Chan. In Smokeless Kitchens for the Millions, S. P. Raju (1953) includes designs for models with one to three cooking holes and hot water pot (The Christian Literature Society, P. O. Box 501, Park Town, Madras, India).

000 Growing other kinds of green and yellow vegetables should be fostered. Although vitamin A value and riboflavin content appear to be critical, in choosing vegetables to be stressed, specialists in agriculture should consider greens [P62] with high calcium and low oxalic acid content also. A variety of edible leaves of trees were used by a few families; some used sweet basil as a vegetable rather than just a seasoning; pumpkin and sweet potato were familiar, but less often used than would be desirable. More green or yellow vegetables which mature when canals are low and aquatic plants no longer available, would be especially good. If increased production by most households[1] is not practicable, a few of the more successful gardeners might be persuaded to produce vegetables and fruits which would help to bridge the gap between rainy seasons. Mushrooms, which can be grown readily, would provide a good source of ribo- [P64] flavin when leafy vegetables are in short supply. The boom-and-bust experience in mushroom culture (See Appendix A, pp. 101-102) might, however, make its revival as a source of healthful food for home use more difficult than if the villagers did not think of mushrooms as a cash crop for which the market failed.

Eating more fruit would help to tide over the dry P62 season. Fruits were commonly used as snacks, not at meal- [P64] time, hence snacks of fruit should be encouraged for adults as well as children. Bananas grew in all gardens and were available the year round. The (4)nam (4)waa variety, which was used in ceremonies, and considered safe for all, should 000 be stressed. More families could grow pineapple, which is [777] relished both raw and in curries. Mango and papaya, fruits of outstanding value for both vitamin A and ascorbic acid, would be excellent, but the idea that growing papayas is "unlucky" must be taken into account. If a few of the more thoughtful and forward-looking farmers could be persuaded to start papaya trees, even though they were not willing to plant them near the house, the practice might spread in time.

146 On the average, the Bang Chan diet did not seem to be [P64] very deficient in protein, but distribution is not proportional to need, and protein deficiency may be in part responsible for periods of weight loss, or failure to gain, so 000 common among infants and children. The presence of other [136] essential nutrients in animal foods is important also. If, the local supply of fish is indeed diminishing, efforts to [228] increase it through pond culture should be continued. Abandonment of tilapia culture in Bang Chan, after about one-third of the families had tried it, (Appendix A, p. 101) suggests that not enough of the right kind of help was given

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1. Tenant farmers may not be permitted to enlarge gardens by mounding at the expense of rice fields.

Notes on Tilapia Culture in Bang Chan

228 654 In 1952, the Thai government, at the suggestion of FAO, began to encourage tilapia culture. Fingerlings and some information on tilapia culture could be obtained from the Minburi district office, where a demonstration pond was maintained. Early in 1953, we learned from the records of the district officer that three persons in Bang Chan, two of them hamlet headmen, had obtained tilapia from this source. In 1953 the commune chief called a meeting in the village and explained the importance of tilapia raising. In May 1955 when Ralis conducted a survey in Bang Chan (Goldsen and Ralis, 1957), tilapia raising had been tried in nearly a third (31%) of the households, but was considered by 2/3 of the respondents to pay little.

The authors comment:

> From discussions with the people it appears that they are learning by trial and error to raise tilapia. Though fish culture is, for them, mainly a sideline activity, nevertheless, it requires the building of a special dam, care in preventing other fish from devouring young tilapia and maintaining the appropriate balance of fresh water in a given pool. The loss resulting from the fish dying or being eaten by others is relatively high. Although tilapia multiply [434] - rapidly, the cash return is not as great as that realized from mushroom growing. The cycle of raising tilapia lasts about four months.

From the comments just quoted, tilapia culture appears to have been undertaken for the anticipated cash return. No [114] information was obtained by Ralis concerning the extent to which the villagers used tilapia to increase their supply of fish for home use. In the summer of 1957 members of the research group who visited Bang Chan found that no one was raising tilapia; they were neither a source of food nor of cash. Some indication was obtained that their flavor and texture were not agreeable. Clearly the attempt to introduce a rapidly growing but unfamiliar variety of fish failed in Bang Chan. An understanding of the reasons for this failure might help to prevent other costly failures in future.

Notes on Mushroom Culture in Bang Chan

177 • 244 Goldsen and Ralis (1957) commented as follows:

> Three years ago the commercial growing of mushrooms in Bang Chan was unknown. By 1955, the practice of growing mushrooms had reached into many homes (44 per

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244 cent of the respondents report that they have engaged in this activity). Even if no mushrooms have ever been grown in a given household, it is still likely that the individuals in it are aware of the practice and have observed it closely through the mushroom growing activities of their friends, relatives, and neighbors (reported in 43 per cent of the households). Only a few households (13 per cent) report that they have never grown mushrooms or have never been exposed to it in this way.

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244 At the height of the boom, the demand for rice straw
234 swept many of the fields clean of the stubble usually left
177 there after harvest, thereby decreasing food for the roaming buffalo and the small increment of nutrients usually plowed back into the soil.

The advantages of mushroom culture cited by Goldsen and Ralis (1957) were 1) the cash outlay required was small, 2) returns were realized quickly as the cycle was completed in two to three weeks, 3) little heavy work was required and 4) at the time when Ralis made the survey, a ready market was available. When, in 1957, the price dropped sharply, most of the growers gave up.

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[431]
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Food for Homage-to-the-Teacher Rite Performed by a Buddhist Priest Who Was a Traditional Practitioner

Item	Amount	Cost in Baht
Cereals and Legume Seeds:		
Rice noodles		10.
Soybeans & fermented vegetables	25 kg.	12.
Mung beans	10 lit.	25.
Cassava flour		2.25
Sugar and dessert:		
Palm sugar	1 pail	67.
Cane sugar	14 kg.	85.
(2)Kha-(5)nom (3)tuaj-(1)foo	500 cups	35.
Fish and Meat:		
Fish ((1)plaa (2)myk) for soup		6.
Silurus and serpenthead	60 kg.	gift
Dried fish	6	gift
Roasted fish	3 kg.	gift
Shrimp paste	2 kg.	18.
Lobsters		15.
Lobsters (for soup)		7.50
Pig's skin (for soup)		10.
Beef[1]	15 kg.	150.
Ingredients for Mussel-man curry[1]		27.
Boiled chickens[2]	2	22.
Pig's head[2]	4 heads	222.
Pork[2]	4 kg.	40.

121 I recall seeing portable motors stored in some Bang Chan houses and
[243] can still picture many threshing floors with neatly layered heaps
[244] of rice straw where the mushrooms grew. A few of these apparently "progressive" farmers had special ponds to which they proudly invited me to watch the feeding of the tilapia fish. Occasionally one of them seized the opportunity of my visit to inquire about sending a sick kinsman to a Bangkok hospital. Without Dr. Goldsen's analysis I might easily have been lured to generalize that certain farmers were "innovation minded."

*177 The survey's evidence against a general "innovation mindedness"
*178 cautioned me to reconsider my impressions. I realized that it would
121 be an oversimplification of the social network in Bang Chan to
621 think of it as containing a group of "progressives" who sought avidly each new agricultural wrinkle and who pitted themselves against another group of "conservatives" who resisted change. Instead I was led to see some farmers interested in certain new things, others indifferent to these but interested in other things. Bang Chan looked more like a mosaic of small groups, each fitting or rejecting the new according to its circumstance.

*177 Instead of thinking simply of a group of highly motivated,
*178 wealthy farmers who assumed the responsibility of trying out the
243 new for the benefit of their less affluent neighbors, I was
244 alerted to recognize a variety of kinds of innovation. Innovation in growing rice, where one might employ a motor or fertilizer, differed considerably from earning extra cash during the dry season by growing mushrooms. The analysis of the survey evidence made me sensitive to the realization that mushroom culture was clearly a seasonal activity requiring little investment and open to any family, rich or poor, that needed cash. Certainly no genuine rice farmer would permit this extra work to interfere when the rains called time for ploughing. The finding that no correlation existed between acceptance of motors and growing mushrooms seemed in retrospect clear, almost self-evident.

*177 The survey analysis indicating that owning a motor, despite
182 my initial impressions, bears no relation to use of modern medical
244 facilities, made me reexamine my initial impressions. My own
757 studies had made me aware that making a living is a positive action among Bang Chan farmers: it requires forethought and will. Health, however, for Bang Chan is a kind of negative entity to be taken for granted until sickness arrives. Bang Chan has no vitamin pills nor tonics to maintain health, though all work actively to relieve sickness. Growing mushrooms and using modern medical facilities are phenomenally different undertakings. Certainly the survey analysis in this regard bore out and corroborated this "thematic" analysis.

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The Innovations

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A. Agricultural Innovations: During the past few years, certain innovations have come to Bang Chan which have increased agricultural productivity and improved the level of living. Some of these innovations are listed below.

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[ZH]

1. The small motor. One innovation is the small engine, gasoline motor, which is used mainly as a water-lifting device for irrigation purposes. In 1950 only five small motors were found in Bang Chan.* Twenty-one per cent of the respondents in the 1955 survey, however, report owning these motors; the majority of the respondents (68 per cent) claim to have used this labor-saving device which is sometimes jointly owned by more than one household and is frequently loaned out.**

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2. Straw mushroom growing. Three years ago the commercial growing of mushrooms in Bang Chan was unknown. By 1955, the practice of growing mushrooms had reached into many homes (44 per cent of the respondents report that they have engaged in this activity***). Even if no mushrooms have ever been grown in a given household, it is still likely that the individuals in it are aware of the practice and have observed it closely through the mushroom growing activities of their friends, relatives, and neighbors (reported in 43 per cent of the households). Only a few households (13 per cent) report that they have never grown mushrooms or have never been exposed to it in this way.

One advantage in the culture of straw mushrooms is that it permits quickly realized returns. The cycle, from sowing spores in moistened straw to harvesting the mushrooms, takes about two to three weeks. Another advantage is that there is relatively little heavy work or investment required besides the acquisition of straw and spores. A third advantage is a ready market, for the plant is sought by Chinese dealers in Bangkok who supply hotels and restaurants. Bang Chan rice farmers who engage in mushroom growing as a sideline activity sell it either to local middlemen or directly to the Chinese in Bangkok.

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[113] * Sharp, L., H. M. Hauck, K. Janlekha, and R. B. Textor, Siamese Rice Village, A Preliminary Study of Bang Chan. Thailand, Cornell Research Center, June, 1953.

[125] ** The questions: "Do you own a small engine motor or not? (If 'NO'): Have you ever made use of one in your work?"

[125] *** The question: "Have you ever grown mushrooms, or not?"

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TABLE 1. THOSE WHO OWN OR USE SMALL MOTOR ARE MORE LIKELY THAN OTHERS TO TRY OTHER AGRICULTURAL INNOVATIONS (FARMERS ONLY)

	Owns motor	Does not own motor but uses it	Neither owns nor has used motor
(Total cases)*	(70)	(150)	(106)
Have you ever used fertiliser?**			
Yes	18%	16%	3%
No	82	84	97
Have you ever raised tilapia?			
Yes	33%	29%	22%
No	47	71	78
Have you ever grown mushrooms?			
Yes	48%	49%	37%
No	52	51	66

[125]

* The bases on which per cents are computed appear in parenthesis at the head of each column in this and subsequent tables. Actually the bases vary by a few cases, table to table, since there were always a few respondents who did not answer a given question or whose answers were unclassifiable.

** Asked of farmers only. The bases are:

Owns motor	65
Does not own motor but uses it	141
Neither owns nor has used motor	82
NA	5

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There is some evidence, then, that if a person is willing to try out one agricultural device, such as the motor, he is more likely to try out other agricultural innovations. However, this "clustering" cannot support the hypothesis that there is something like "innovation mindedness" in general, or that acceptance of any innovation in a series is predictive of acceptance of all other innovations in the same series.

Evidence may be cited to substantiate this contention. In the first place, if such a clustering indeed prevailed, one would expect users of any of these agricultural innovations to be more disposed than others to use, as well, certain non-agricultural innovations, such as hospital or clinic facilities, for example.

*178 *177 228 241 244 743 182

And no such tendency may be discerned in the present data. (See Table 2.)

TABLE 2. USERS OF HOSPITAL AND CLINIC FACILITIES SHOW NO SIGNIFICANT DIFFERENCES IN RATES OF ACCEPTANCE OF AGRICULTURAL INNOVATIONS

Agricultural Innovations	Percentage who have ever gone to hospital or clinic for treatment	Total cases
Mushrooms		
Tried them out	36%	(143)
Never did	38	(108)
Tilapia		
Tried it out	44%	(104)
Never did	34.	(225)
Motor		
Tried it out	37%	(213)
Never did	36	(106)
Fertiliser*		
Tried it out	37%	(32)
Never did	34	(232)

* Farmers only

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In the second place: use of the motor is much less strongly linked to use of mushrooms than the use of fertiliser or tilapia. It may well be that there may be some common factor strongly underlying the decision to use the motor on the one hand, fertiliser and tilapia on the other, while the decision to try mushroom-growing is relatively more "autonomous". A possible explanation for the greater "autonomy" may be sought in the differential requirements for growing mushrooms compared with the requirements for adopting the other innovations.

Both tilapia and sulphates demand extra heavy work, care, an essential initial investment, and willingness to wait for a delayed return. An additional requirement for a successful and continuous pay-off from both these innovations may be an aptitude to follow rather complicated instructions. In the case of mushroom growing, however, the initial investment is relatively small, the labor may be tedious but is not heavy, no protracted or complicated care is involved, and the results of the effort are relatively quickly realizable.

There is some justification, then, for the inference that initial adoption of innovations such as fertiliser and tilapia, which require increased labor, will depend to some extent upon the availability of some labor-saving device (such as the small motor) which will enable the busy farmer to perform the necessary labor and, perhaps, leave him freer to exercise the care required for these innovations to be successful. Hence the relatively stronger relationship among these innovations. An innovation which does not make these demands, however (such as mushroom growing), is more likely to find acceptance on its own terms and may thus be less dependent for its acceptance upon availability of some sort of labor-saving device.

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Innovation and Attitude Towards It

There is further evidence in the survey substantiating the greater "autonomy" so to speak, of the decision to try mushroom culture compared with the decision to try fertiliser or tilapia.

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The present study tested the hypothesis that use of these innovations would be related to a favorable attitude toward them. Attitude toward the four innovations was determined by examining responses to the questions: "What is your opinion about fertiliser?" "...about mushroom growing?" "...about tilapia?" Responses were classified according to whether they revealed positive, mixed, or negative affective feelings to each of the innovations.

[121]
[125]

In general, positive attitudes towards all these innovations are widespread in Bang Chan. About three-quarters of the residents express positive feelings toward mushroom growing and over half express positive attitudes to artificial fertiliser and tilapia raising. (See Table 3.) None of these innovations elicits widespread expressions of disfavor, although the respondents are more likely to express an unfavorable attitude to tilapia (29 per cent) than to fertiliser (14 per cent) or to mushrooms (7 per cent)

TABLE 3. THE MAJORITY IN BANG CHAN HOLD POSITIVE ATTITUDES TOWARDS AGRICULTURAL INTRODUCTIONS

Attitude	"What is your opinion about..." Mushrooms	Fertiliser	Tilapia
Positive	76%	59%	57%
Neutral or mixed*	6	3	2
Negative	7	14	29
No opinion	9	16	8
Not ascertainable	2	8	4
Total cases	(333)	(333)	(333)

* The neutral or mixed attitude category comprises responses conveying partly favorable and partly unfavorable feelings such as, "some kind is good, some kind is not so good"; "in some ways I like it, in some ways I dislike it."

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228 Now let us examine the extent to which the decision to try out
241 the innovation is linked to a positive feeling towards it. The decision to try fertiliser and to raise tilapia turned out to be indeed linked with positive feelings towards these innovations. Among those favoring fertiliser, the proportion using it is six times as high as those with neutral, mixed or negative attitudes (18 versus 3 per cent); among those with positive attitudes to tilapia raisers of this fish are twice as frequent in comparison with those having neutral, mixed, or negative attitudes (43 versus 22 per cent). These relationships are shown in Table 4 below.

TABLE 4. ATTITUDES TO FERTILISER AND TILAPIA RAISING ARE LINKED TO THEIR USE

	Attitude	
	Positive	Neutral, Mixed & Negative
Fertiliser		
Tried it out	18%	3%
Never did	82	97
Total cases*	(168)	(55)
Tilapia		
Tried it out	43%	22%
Never did	57	78
Total cases	(191)	(104)

[125] * Based on responses made by 293 farmers who expressed a codable attitude to fertiliser.

• 244 On the other hand, the data revealed no relationship between
*177 attitude to mushroom growing and growing them. The proportion of
*178 users and former users among those who have favorable attitudes and those who have negative attitudes remains relatively constant. Table 5 shows that among respondents with positive attitudes, 47 per cent have tried mushroom growing; while among respondents with negative attitudes, 42 per cent have done so; percentage differences are statistically insignificant.

TABLE 5. ATTITUDES TO MUSHROOM GROWING SHOW NO RELATION TO ITS ADOPTION

	Attitude	
	Positive	Neutral or Negative
	(252)	(42)
Tried mushrooms	47%	42%
Never did	53%	58%

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It appears, then, that we may be dealing with two types of innovations, one type (fertilizer and tilapia) where attitude is linked to decision to use it and another (mushrooms) where attitude seems to be unrelated to such use.* And here again may be further substantiation of the greater autonomy of the acceptance of mushroom growing. For, in the case of innovations such as artificial fertilizer and tilapia, it is known that they require investment of funds and labor, risk, delayed return, and departure from well-known ways. It could be that in the face of these disadvantages Acceptance will occur only if motivation is high. Acceptors would then be selected mainly from among those who have high motivation and accompanying positive affective feeling. Those who do not have these feelings would, following this reasoning, be less likely to overcome their objections to the disadvantages of the innovation in question.

There is also the second type of innovation like mushroom growing. This innovation is much less "costly" not only of funds but effort. Hence, high motivation and accompanying positive affect might be less influential than other factors--factors quite aside from the crop itself--on acceptance of this type of innovation. Consequently, growers of mushrooms may be recruited equally from persons with favorable attitudes and less favorable attitudes towards this crop.

These findings suggest the more general hypothesis (which might be corroborated by analysis of related contextual data collected in Bang Chan, and by examining equivalent situations in other underdeveloped areas) that: the more complex the innovation, the more effort involved in employing it, the more risk involved, and the less immediate the return, the greater the likelihood that acceptors will be recruited from a selected group of highly motivated people, rather than at random among all persons "eligible" to accept it. If the innovation requires the high motivation which is needed to overcome the disadvantages of investment, work, risk, and rarity, then this attitude toward it is important. If the innovation demands only short-term investment and relatively light labor, then this motivation is of little importance in the decision to try it.

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Sociological Factors in Agricultural Innovation

The decision to use the small motor, once made, tends to accelerate the decision to try out other agricultural innovations, especially fertilizer and tilapia and, to a lesser extent, even mushrooms.

* Both mushroom growing and tilapia raising are sideline activities to the Bang Chan rice farmer and are, therefore, comparable in this respect.

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228 mushrooms. The following section searches for sociological factors
241 linked to these decisions. For example, are the well-to-do farmers*
more apt than the less well-to-do to adopt agricultural innovations?
To what extent is literacy a factor in acceptance of innovations?
• 244 To what extent do differences in literacy, communications habits,
cultural contacts and urban orientation account for tendencies to
adopt or reject these changes?

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[125]* The following analysis has been made, in most cases, for male
farmers only. The distribution of initial acceptance among the three
groups of male farmers, females, and male non-farmers is given in
*179 the following table.

*178 TABLE 6. USE OF AGRICULTURAL INNOVATIONS AMONG THREE GROUPS OF BANG
CHAN VILLAGERS

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	Male Farmers (211)	Male Non-farmers (82)	Females (32)
228 Tried motor	71%	61%	48%
Didn't try	29	39	52
241 Tried mushroom growing	46%	39%	41%
Didn't try	54	61	59
Tried tilapia raising	35%	25%	31%
Didn't try	65	75	69
Tried fertiliser	15%	5%	**
Didn't try	85	95	

** Asked of farmers only.

It is apparent, as one would expect, that it is mainly the farmers who try these innovations. Relatively few women (with the exception of tilapia raising) and even fewer non-farmers say they have tried them. Since the absolute number of acceptors among women and non-farmers is too small to bear the separate treatment which would be essential to analyse the factors influencing the use or non-use of innovations, they have been excluded from the following presentation, which refers, thus, to male farmers only.

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Decisions to use all these innovations--with the possible exception of the use of fertiliser--seem to be more widespread among the upper economic levels of the population. (See Table 8.) One wonders whether the initial link between use of the motor and readiness to try the innovations may actually disguise a more basic relationship based simply on ability to afford the investment and the risk.

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TABLE 8. FARMERS* ON HIGHER SES LEVELS ARE MORE LIKELY THAN OTHERS TO HAVE USED THE MOTOR, TO HAVE GROWN MUSHROOMS AND TO HAVE RAISED TILAPIA

	Ownership of Buffaloes	
	2 or less (99)	3 or more (112)
Used motor		
Own	6%	37%
Use	53	45
Neither	41	18
Grew mushrooms		
Yes	30%	60%
No	70	40
Raised tilapia		
Yes	26%	42%
No	74	58
Used fertiliser		
Yes	12%	17%
No	78	83

* Male farmers only

The following table presents again the initial relationships between use of motor and readiness to try out other innovations. But this time the link is examined separately for persons on the different economic levels.

Table 9 was made by first dividing the population into two groups, those from high and those from low economic levels. The resulting two groups were then further subdivided on the basis of whether they owned (or used) a motor or whether they did not. In each of the four resultant groups the percentage that raised tilapia was then calculated. Thus among those of high economic level who own or use motors, 45 per cent raised tilapia, and we infer that 55 per cent did not raise tilapia. The same procedure was repeated to ascertain the percentage that has tried fertiliser and subsequently the percentage that has tried mushroom growing.

This table shows that in tilapia raising both factors operate independently and cumulatively, i.e. people who are better off economically and who also own or use the motor are almost two and a half times as likely to raise tilapia as their economically depressed counterparts who neither own nor have access to the motor. (45 versus 17 per cent respectively.)

The link between use of the motor and attempt to try fertilizer holds regardless of economic level.

The initial link between ownership or use of the motor and growing of mushrooms, on the other hand, is shown to be a conditional one. Those on a higher economic level are more likely than others to try mushroom growing, whether or not they own or use a motor. Those on the lower economic level, with access to a motor are more likely to take up tilapia culture.

TABLE 9. RELATIONSHIP OF USE OF MOTOR AND OTHER INNOVATIONS TO ECONOMIC LEVEL

	Economic Level			
	High*		Low**	
Owns or used motor (Proportion who have raised tilapia)				
Yes	45%	(89)	33%	(57)
No	25	(21)	17	(40)
Owns or used motor (Proportion who have tried fertilizer)				
Yes	20%	(89)	18%	(57)
No	5	(21)	*	(40)
Owns or used motor (Proportion who have tried mushroom growing)				
Yes	60%	(89)	36%	(57)
No	57	(21)	23	(40)

* Three buffaloes or more
** Two buffaloes or fewer

[231]

Literacy

One important hypothesis to account for differential acceptance of innovations is that the decision to try them out is aided by exposure to the available sources of information. If this were indeed the case, then users of these innovations will be more apt to be able to read and write than be illiterate.

Literacy was determined by asking each respondent whether

6: Goldsen and Ralis Z-4,5 (1955) 1957
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125 he could write, could only sign his name, or could do neither.* Those who said they could write a letter are considered here to be 212 literate. All others are grouped together as illiterates or on a low level of literacy.

212 The literacy rating was tested for validity as follows: in Bang Chan literacy is known to be related to age. Ever since 872 1935** there has been a school in the community. Since that date school attendance has been compulsory. Attendance has been fairly 125 full for the last twenty years, but most older residents have never had the opportunity for formal schooling.

212 The survey data reflect this correlation between literacy and age. Among farmers under 40 years of age, only 16 per cent were *177 rated as illiterate or barely literate by the survey criterion; *178 while 59 per cent of those of 40 years or older are rated as illiterate. Thus one can have reasonable confidence in the survey 561 response as a rating of literacy.

TABLE 10. LITERACY OF FARMERS DECREASES WITH AGE

	Age	
	Under 40 yrs.	40 yrs. or more
Literacy		
Illiterate	16%	59%
Literate	84	41
Total cases	(79)	(131)

*177 Literacy is linked discernibly to acceptance of the motor and *178 mushroom growing. The proportion of literate farmers who have tried the motor is twice as high as the corresponding proportion 228 among those who are illiterate. It is less strongly linked to the 241 decision to grow mushrooms, and is, at best, weakly linked to the decision to raise tilapia or to use fertilizer.

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212 * In addition, interviewers asked respondents who said they 402 could write to demonstrate it by writing something on the questionnaire.

[125] ** See Siamese Rice Village, op. cit.

TABLE 11. LITERATE FARMERS* ARE MORE LIKELY TO HAVE USED THE MOTOR AND TO HAVE TRIED MUSHROOM GROWING

	Illiterate (Cannot write a letter) (92)	Literate (Can write a letter) (119)
Motor		
Own	16%	26%
Use	35	60
Neither	48	14
Mushrooms		
Have tried	38%	53%
Have not	62	47
Fertiliser		
Have used	12%	17%
Have not	88	83
Tilapia		
Have tried	29%	39%
Have not	71	61

* Male farmers only

If Bang Chan were like certain areas of the United States and Europe, it might be objected that such a relationship between acceptance of innovations and literacy reflects a spurious link with economic level: that illiterates tend to come from the economically deprived strata of the population; hence an observed relationship with literacy may actually reflect the initial correlation with economic level. In Bang Chan, however, this is not the case. A Bang Chan farmer who is well-to-do is as likely to be illiterate as literate, as is illustrated by the table below.

TABLE 12. LITERACY AND ECONOMIC LEVELS ARE UNRELATED IN BANG CHAN*

	Literacy	
	Low (91)	High (119)
Economic Level		
Low	48%	36%
High	52	64

* Male farmers only

Hence the correlation between use of innovations and literacy may be taken at face value and does not reflect a spurious link with economic level.

Communications Media

* 177 *178 207 546 With the increasing use of mass communications, the community member is exposed to sources of information other than the printed word. Ownership of radios has nearly tripled in about five years (in the 1955 survey radios were reported in 14 per cent of the households, whereas in 1949* only 5 per cent of the households reported owning a radio). Quite apart from ownership, radio listening is widespread; less than one-fifth of the people in Bang Chan claim they never listen to the radio (18 per cent). Motion pictures are also popular. Only one-tenth claim to having never attended a movie, while half (49 per cent) say they have seen motion pictures more than ten times.

There is, of course, a strong relationship between exposure to one of these media and exposure to the other. Table 13 below indicates that the majority (64 per cent) of respondents who listen to the radio likewise report frequent movie attendance. Similarly, the majority (67 per cent) of those who say they never listen to the radio, reported that they go to movies rarely or never.

TABLE 13. EXPOSURE TO RADIO AND MOVIES SHOWS HIGH INTERRELATION

	Radio Listening		
Movie Attendance	High Exposure (regular or occasional listeners) (111)	Low Exposure (listen seldom) (148)	No Exposure (60)
High exposure (10 times or more)	64%	32%	12%
Medium exposure (4 to 9 times)	19	17	21
Low Exposure (0 to 3 times)	16	31	67

[402] [241] [228] [244] Exposure to the communications media is strongly linked to acceptance of a basic innovation such as the motor. It is not directly linked to acceptance of the other agricultural innovations (fertilizer, tilapia, mushrooms). Respondents who report frequent exposure to radio listening and motion picture attendance are significantly more likely than others to say they own or have used the motor. (Among daily radio listeners 88 per cent report use of the motor; and this proportion declines steadily until among those who never listen, only 46 per cent use the motor; for movies, the corresponding proportion of users ranges from 76 to 36 per cent.)

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* Siamese Rice Village, op. cit.

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TABLE 16. INHABITANTS WHO HAVE ADOPTED URBAN EATING PATTERNS ARE MORE LIKELY THAN OTHERS TO BE EXPOSED TO MASS COMMUNICATIONS AND URBAN CONTACTS

	Eating Patterns	
	With hands (242)	With fork and/or spoon (84)
Listens to radio		
Regularly (daily)	10%	25%
Occasionally	17	28
Seldom	51	35
Never	22	10
Has seen a movie		
Ten times or more	40%	72%
4 - 9 times	19	17
1 - 3 times	28	10
Never	13	1
This past year, how many times did you go to Bangkok?		
None	26%	7%
Once	18	15
2 - 4 times	29	23
5 or more times	28	55

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When acceptance of urban influences is measured even on the basis of this index, the evidence is clear that it is linked with acceptance of the agricultural innovations. Those responsive to urban influence are twice as likely as others to use fertiliser (21 per cent versus 9 per cent), one and a half times as likely to grow mushrooms (57 per cent versus 39 per cent), and one and a quarter times as likely to use a motor than the others (82 per cent versus 61 per cent). There is no noticeable relationship, however, between tilapia raising and responsiveness to urban influences. The respective proportions are shown in Table 17.

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These relationships between acceptance of urban patterns and decision to use certain innovations remain constant for those on high as well as low economic levels and also for the literate as well as illiterate farmers.

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TABLE 17. VILLAGERS RESPONSIVE TO URBAN PATTERNS ARE MORE LIKELY THAN OTHERS TO USE AGRICULTURAL INNOVATIONS

Agricultural Innovations	Eat with fork and/or spoon	Eat with hands
Artificial fertiliser		
Tried it	21%	9%
Never did	79	91
Total cases*	(69)	(218)
Mushrooms		
Tried growing	57%	39%
Never did	43	61
Total cases	(84)	(242)
Small engine motor		
Own one or have used it	82%	61%
Never did	18	39
Total cases	(84)	(242)

* For farmers only; excludes all non-farmers

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TABLE 18. ACCEPTANCE OF URBAN PATTERNS IS LINKED TO ACCEPTANCE OF MOTOR AND MUSHROOM GROWING, IRRESPECTIVE OF ECONOMIC AND LITERACY LEVELS

	Economic Level				Literacy Level			
	Low		High		Illiterate		Literate	
Acceptance of urban patterns	(Proportion who used motor)							
Eat with hands	55%	(77)	76%	(73)	47%	(73)	83%	(76)
Fork or spoon	75	(20)	89	(34)	69%	(16)	90	(38)
	(Proportion who tried mushroom growing)							
Eat with hands	28%	(77)	58%	(73)	38%	(73)	47%	(76)
Fork or spoon	45	(20)	65	(34)	44	(16)	66	(40)
	(Proportion who used fertiliser)							
Eat with hands	11%	(77)	13%	(73)	10%	(73)	14%	(76)
Fork or spoon	19	(20)	26	(34)	3	(16)	23	(40)

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as apt to adopt the motor irrespective of whether he has been in contact with urban culture.

TABLE 20. ILLITERATE FARMERS* WITH WIDER CULTURE CONTACTS ARE MORE LIKELY THAN OTHERS TO USE THE MOTOR

	Illiterate (Proportion using the motor)		Literate (Proportion using the motor)	
Trips to the airport				
None	38%	(40)	86%	(35)
One or more	63	(49)	86	(83)
Visits to the agricultural fair				
None	50%	(67)	85%	(76)
One or more	57	(24)	88	(43)

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*Male farmers only

However, no such relationship was discerned between these culture contacts and trying out either fertilizer, tilapia, or mushrooms.

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Here again, is evidence to support the hypothesis that contacts with urban culture may act as a substitute for literacy in making the farmer more sophisticated about improving his standard of living and level of production. But the data show that such exposure need not result from direct physical contact with urban centers; it can, instead, be a result of indirect contact. Direct physical contact with urban culture, it turns out is effective in increasing the incidence of acceptance of the more complex innovations only for the illiterate farmers of Bang Chan.

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Friendships

The same reasoning which would lead one to expect a higher incidence of acceptance of innovations among those directly exposed to urban contacts would lead to the companion hypothesis: that inhabitants who have a greater degree of internal contacts with their friends and neighbors might tend to try out innovations to a greater extent than those who remain relatively aloof from such social contacts.

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The data show that such contacts have a limited connection with acceptance of innovations. The incidence of motor use and tilapia raising is higher, it is true, among persons who report a wider sphere of social circulation; but there is little relation between social contacts and willingness to try out fertilizer or mushrooms.

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TABLE 21. INCIDENCE OF MOTOR USE IS HIGHER AMONG VILLAGERS WHO REPORT WIDER SOCIAL CONTACTS

	Social Contacts ("...Do you have more close friends than most people around here, or about the same as most people around here, or fewer close friends than most people around here?")	
	"More" or "the same" (143)	"Fewer" (55)
Motor		
Has used it	77%	55%
Never did	23	45
Tilapia		
Has tried it	39%	21%
Never did	61	79
Fertiliser		
Has used it	16%	11%
Never did	84	89
Mushrooms		
Has tried them	49%	40%
Never did	51	60

Once again, however, when this link between breadth of social contacts and use of the innovations is examined separately for the literate, compared with the illiterate farmers, we find further substantiation of the previous finding that under certain circumstances contact may act as a substitute for literacy in acceptance of complex innovations. For, although the link between social contacts and use of tilapia remains constant for literate as well as illiterate farmers, it is mainly for those who are illiterate that exposure to wider local social contacts is associated with greater incidence of motor use.

[212]

admit in response to a direct question* that they have a debt. Confidence in the validity of these responses as an index of indebtedness is increased since the expected correlation between indebtedness and ownership of buffalo is reflected in the survey data.

TABLE 23. INCIDENCE OF REPORTED DEBT IS HIGHER AMONG VILLAGERS WHO REPORT OWNERSHIP OF MORE BUFFALOES

	Reported Ownership of Buffaloes		
	None (81)	One to three (155)	Four or more (97)
"...Do you now have a debt?			
Yes	49%	56%	69%
No	51	44	31

When the use of agricultural innovations is examined for those farmers who say they have a debt, compared with those who deny it, it becomes apparent that there is a relationship only between indebtedness and use of the motor but not with any of the other mentioned innovations. Seventy-nine per cent of the male farmers who said they have a debt own or use the motor; among those who claim they have no debt the proportion owning or using the motor is significantly less (60 per cent).

TABLE 24. INCIDENCE OF MOTOR USE IS HIGHER AMONG FARMERS WHO REPORT INDEBTEDNESS

	"...Do you now have a debt"**	
	Yes (125)	No (85)
Motor		
Has used it	79%	60%
Never did	21	40
Tilapia		
Has tried it	37%	33%
Never did	63	67
Fertilizer		
Has used it	14%	16%
Never did	86	84
Mushrooms		
Has tried them	45%	48%
Never did	55	52

**Male farmers only

* The question: "...I'd like to ask about a problem common in rural places all over the world. Do you now have a debt or not?" Janiskha's M.S. thesis, ibid., reports a similar distribution of indebtedness for his sample of 96 farmers.

*178

743 Use of Health Facilities and Other Factors Associated With
241 Agricultural Innovations

572 Although use of the basic agricultural innovations was shown
426 to be linked to breadth of contacts within the community, on the one hand, and to indebtedness, on the other hand, the association between these factors and use of modern health facilities, although showing the same tendency, is not statistically significant. For the sake of completeness, the figures are reported below:

TABLE 34. NO RELATIONSHIP BETWEEN INDEBTEDNESS OR INTERNAL SOCIAL CONTACTS AND USE OF HOSPITALS AND CLINICS

	"Have you ever been to a clinic or a hospital?"			
	No, Never	Yes, for treatment	Yes, for other reasons	Total 100%
Social Contacts				
"More friends"	31%	35%	34%	(62)
"The same"	40	35	25	(154)
"Fewer friends"	32	41	27	(94)
Do you now have a debt?				
No	40%	32%	28%	(140)
Yes	33	41	26	(192)

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SUMMARY

1. In the community of Bang Chan in Central Thailand, various factors are studied statistically in order better to determine the conditions of acceptance of selected agricultural innovations and conditions for using the facilities of modern medicine in clinics and hospitals. Four agricultural innovations were selected, viz. gasoline motor, raising of fish (tilapia), use of fertilizer, and mushroom culture.

2. The present study was concerned with the initial adoption or trial of innovations, rather than the continuing use of these innovations or the merging of the new with the old features of the culture.

3. While adoption of the gasoline motor was associated with all other agricultural innovations, no generalized acceptance of the new was found because: a) adoption of the gasoline motor bore little or no relation to use of non-agricultural innovations such as hospital and clinic facilities; and b) adoption of gasoline motors was only weakly associated with raising of mushrooms.

4. A cluster of traits including high motivation and sizable capital outlay was associated with the use of the gasoline motor.

The motor users formed a group with higher economic level, greater literacy, higher acceptance of urban ways of life, more frequent exposure to mass media, broader social contacts within the community, and greater use of credit facilities. Illiterate farmers might also be motor users, if their contacts with urban centers were extensive.

5. Acceptance of mushroom culture was a special case of agricultural innovation: a) as distinct from all other attitudes toward innovation, mushroom growers were not marked by their high positive attitudes toward mushroom culture; b) the investment in mushroom raising per se was less than the investment and risk required by other types of agricultural innovation.

6. The mushroom growers as a group distinct from non-mushroom growers were more literate and acceptive of urban ways. Tilapia raisers were of a higher economic level and had greater community contacts than non-tilapia raisers.

7. An hypothesis was offered: that innovations differ in complexity and investment of effort required. The more complex presuppose greater investment, work, risk and postponement of returns; hence this complex kind requires greater motivation than the simpler ones such as mushroom raising.

8. Use of hospital and clinic facilities was more frequent among the literate, those exposed to mass media, those accepting of urban ways and those having greater contacts with the city. Unlike accepters of agricultural innovations, users of modern medical facilities were not of a higher economic level than non-users and could not be clearly distinguished on the basis of breadth of contact within the community or use of credit facilities.

197*
178*
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572

43

7. I understand that, since the last war, there have been, around here, some introductions of new things in the field of rice farming, other farming, gardening, and fishing in order to raise production. What are these various new things? [177*] [178*] [125]

1.	Fertiliser	9
2.	Small engine	4
3.	New rice seeds	3
4.	Tilapia	98
5.	Other fish, specified	13
6.	Fish, unspecified	80
7.	Mushrooms	45
8.	Poultry	179
9.	Pigs	21
X.	Other, specify	68
0.	Unascertainable	45

[241] [402] [243] [228] [244] [235] [231]

8. Here, some farmers get a lot more rice from one rai of land than others get. Generally speaking, what are the various reasons why this is so? [243] [433]

1.	Fertiliser	59
2.	Skill of the farmer	63
3.	Quality of the soil	65
4.	Irrigation facilities	125
5.	Type of seed	17
6.	Other reason, specify _____	53

9.a. When was it more profitable for you to grow rice, this year just finished, or two or three years ago? [243] [434]

1.	This past year	131
2.	No difference	57
3.	2 or 3 years ago	62
4.	Unascertainable	25
—	Does not apply	8

b. If 2-3 years ago: If this is so, then it has become less profitable to grow rice. Such being the case, have you done anything to improve the income of your family?

7.	Yes	36
8.	No	25
9.	Unascertainable	1

c. If yes: what various things have you done?

5.	Nothing	4
6.	Mushrooms	6
7.	Poultry	8
8.	Fish (Incl. Tilapia)	5
9.	Fertiliser	
X.	Other, specify _____	25
Y.	Unascertainable	2

10.a. Do you own a small engine motor, or not? [402]

1.	Yes	70
2.	No	259
—	No Answer	4

125
[402] b. If no: Have you ever made use of one in your work, or not?
3. Yes 145
4. No 106
5. Unascertainable 8

11. What is your opinion about fertiliser?
(See code at end)

[241] 12.a. IF R IS A FARMER: Have you ever used fertiliser or not?
6. Does not apply 17
7. Yes 32
8. No 232
— No Answer 12

b. IF HAS NOT USED FERTILIZER: For what various reasons have you not used fertiliser?
(See code at end)

c. IF HAS USED FERTILIZER: Have you ever used fertiliser in your seed-bed or not?
9. Yes 20
X. No 13

d. IF HAS USED FERTILIZER: To what extent have you used fertiliser on your fields? On all your fields, or on the larger part of your fields, or on the smaller part of your fields?
1. On all fields 4
2. On larger part of fields 4
3. On minor part of fields 24
4. Unascertainable 1

13. What is your opinion about mushroom growing?
(See code at end)

[244] 14.a. Have you ever grown mushrooms, or not?
1. Yes 143
2. No 188
— No Answer 2

b. IF NO: Do you have any relatives or relative-like neighbors, who have grown mushrooms or not?
3. Yes 141
4. No 44
5. Unascertainable 4

15.a. What is your opinion about tilapia raising?

[228] b. Have you ever raised tilapia, or not?
1. Yes 104
2. No 225
— No Answer 4

125
[244]

b. And how about mushroom growing? Do you think mushroom growing yields very good money, good money, or little money?

5. Very good money	68
6. Good money	160
7. Little money	49
8. Unascertainable	56

[228]

c. And what about Tilapia. Do you think tilapia raising pays very good money, or good money, or little money?

9. Very good money	15
X. Good money	73
Y. Little money	175
O. Unascertainable	70

[787]

39. Do you believe in medium strongly, somewhat, or not at all?

1. Strongly	12
2. Somewhat	192
3. Not at all	105
4. Unascertainable	24

[166]

40.a. Suppose you could do the same work in another rural place and earn ½ more than here. For example, it would be a place 100 kilometers from here. Would you be willing to leave for that place or not?

5. Yes	118
6. No	203
7. Unascertainable	12

.b. IF NO: For what various reasons would you not be willing to go?

(See code at end)

41.a. If you had no land to work in BC-KY would you move to another place or not?

X. Yes	166
Y. No	112
O. Unascertainable	20
— No Answer	35

b. IF NO: For what various reasons?

(See code at end)

[369]
[829]

42.a. Some people say that, generally speaking people who live in Bangkok have more genuine and lasting happiness than people here in BC-KY. Do you agree or disagree?

1. Agree	136
2. Disagree	134
3. Unascertainable	63

b. IF AGREE: For what various reasons do you agree?

If Agreement (See code at end)

	Qu 11	Qu 13	Qu 15A	
1. Positive, no evidence: very good, good, nice	103	114	77	125 241
2. Positive, with evidence: good results, specific statements	47	120	95	244
3. Neutral or mixed	11	20	6	228
4. Negative, no evidence: no good, bad, of no use	9	5	15	
5. Negative, with evidence: difficult to apply in deep water, must keep using it, too expensive, some results as without fertiliser	33	13	80	
6. Positive, qualified: Fertiliser too expensive	13	—	1	
7. Positive, qualified otherwise: only for high land; very hard to purchase; requires to keep on using it	32	18	18	
8. Respondent states he has no opinion	54	31	26	
X. Negative, qualified: It's not quite good, it depends on the soil	4	4	3	
0. No answer	4	3	1	
9. Respondent's attitude not ascertainable	23	5	11	

	Qu 12B	
0. D.A.	85	125 241
1. Too expensive	78	
2. Difficult to purchase	15	
3. Not fit for low land	39	
4. Soil not suitable	3	
5. No ascertainable reason given	28	
6. Too little land	7	
7. Other reasons	56	
8. Have never used it before. Do not now either	12	
X. N.A.	105	
9.	21	

	Qu 16B	
X. N.A. Unascertainable	60	125 243
0. D.A.	151	435
1. Nothing, cannot do anything	70	458
2. Grow mushrooms	12	
3. Raise poultry	15	
4. Raise fish (including Tilapia	7	
5. Use fertiliser	—	
6. Find job as laborers	6	
7. Other: try to find new seed, sell vegetables, borrow money from neighbors, keep rice until price goes up, economise, send sons to work	26	

*243
132
137 to the buffaloes will be gradually reduced by the process
231 of land preparation.

The homelot is usually surrounded on all sides,
* 244
245 except the one facing the canal, with bamboos which serve
351 to protect the farm home from strong wind. Within this compound there always is a kitchen garden where a variety of plants and vegetables for everyday use are grown. If the homelot is large, there may be enough room at the backyard for an orchard where fruit trees may be grown. In some cases, aquatic plants are cultivated in the canal in front of the house.

137 In addition to cultivated plants, there are to be seen also wild shrubs and vines which are more or less restricted to small strips of land along the banks of the canals. Wild aquatic vegetables, especially the morning glory, are always seen in these canals, making them appear narrower than they actually are.

Livestock

231 Buffaloes: As in most of the rice producing areas of the country, so in Bangchan buffaloes are used in all kinds of farm work where the help of draft animals is needed. Since the village is without land which can be grazed the year-round, buffaloes are not locally bred but are brought in from the northeast and other parts of the kingdom. To be sure, there are some local-born buffaloes, and these are considered to be stronger and to live longer than the imported

7: Janlekha X-4,5 (1948-1953)p956 AO7 Central Thai AO7
Bangchan

243 buffaloes heretofore undreamt of and will have to bear
231 the consequent burden of increased cost of producing rice.
311

Some description of the homelots which constitute
311 almost five per cent of the land area of Bangchan has already
351 been given in the section on vegetation, Chapter II. From
[231] the standpoint of land utilization, functions of the homelot
[235] other than providing standing room for the living quarters
[244] may be mentioned as follows:
[245]
[226]

1. It provides space for threshing and for storage of rice and farm equipment including buffaloes.
2. It provides room for chicken or duck raising.
3. It provides land for a kitchen garden, and for fruit and vegetable growing.
4. It provides space for fish trapping by the draining method.

To serve these functions, homelots in any rice growing village, where the fields are submerged under water during the entire life of the rice plant, must be high above water level during the flood season, must be well drained, and must have pools with ample shade.

243 Rice land in its natural state does not meet these
311 requirements for a homelot. In the first place its level is too low. Second, the impervious layer of clay characteristic of rice land does not permit soil drainage. To make a homelot out of rice land, it is necessary that the prospective site be mounded up to a level two or three feet higher than the level of the surrounding fields. The hole from which

235 Of the 46 families covered by the survey, 23 or one-
433 half raised ducks with an average annual production of 155
434 eggs per duck, and an average of 11.7 ducks per family raising them. Egg production for each of these families thus averaged about 1,800 per year. Of these, 1,350 were consumed by the family and 450 sold at the same price as chicken eggs. It was estimated, then, that from duck eggs alone, the average cash income in 1949 was about 150 baht per family raising ducks.

226 After rice, fish were by far the most important
262 ingredient in the diet of Bangchan. In contrast to poultry,
433 however, fish did not constitute a source of cash income of
[434] the villagers. As a matter of fact, more fish were bought from the outside than the negligible amount that was exported from the village mainly by one or two very poor families who had availed themselves of this means of augmenting
[435] their income. From our consumption study of 106 families in 1953, it was found that of an aggregate amount of 17,786 kilograms consumed by these families in the previous year 16,027 kilograms were caught by the families while 1,759 kilograms were bought at five baht per kilogram. The rate of fish production may thus be estimated at 151 kilograms annually per family, or 44,998 kilograms for the entire village.

262 The same consumption study shows that the 106 fami-
244 lies consumed in 1953 a total of 16,402 kilograms of vegetables
433 all of which were produced or acquired by the families.

7: Janlekha X-4.5 (1948-1953)1956 AO7 Central Thai AO7
Bangchan

262 averaging 174 kilograms annually per family. It should
• 244 be noted here, as will be elaborated in the section on
433 consumption in Part II of this study, that while most respondents could fairly well estimate their rates of consumption of such items as rice and fish sauce which were somewhat constant, they were not as good in estimating their consumption of vegetables. Furthermore, while admitting that they did buy some vegetables during the year, they were reluctant to give any estimate of the purchase for fear of too much inaccuracy. At most, they were willing only to say that the amount of vegetables purchased was only a small fraction of what they produced or acquired freely from the canals.

245 Fruit production was even more difficult to estimate
433 than vegetable production, and we had to be content with only qualitative information which appears in the section on vegetation on pages 42-43 of this study. Our records show that a few families reported nominal incomes of some forty or fifty baht annually from sale of fruit to neighbors.

Table 17 shows estimated village production and surpluses of farm products other than rice, namely, chicken eggs, duck eggs, fish, vegetables, and fruit. The estimates are based on the poultry survey of 1949 and the consumption study of 1953.

*243 While the methods of selling and storing paddy enable
433 the farmer to know the exact amount of his crop, which condi-
*128 tion leads to our confidence in the accuracy of our estimate

[TEXT CONTINUED ON PAGE 129]

*243 requires much additional hand labor and reduces the possibil-
242 ities for mechanization to a minimum. On the other hand, the more labor intensive transplanting method would seem to be more suitable to a population pressure area like Thailand if it really gives as relatively higher a yield as it is claimed to give.

*243 Farm equipment

351 In Thai agriculture, it is very difficult to separate
[235] the farm from the home. In the chapter on the community it
[244] has already been indicated that the home lot not only is the
[245] living place for the farm family but also provides space for
[226] threshing and for storage of farm equipment, room for chicken raising, land for kitchen garden and for fruit and vegetable growing, and space for fish trapping by the draining method.

*243 In other words, all the material components of the farm, except
351 the rice fields, are located or stored on the home lot. Here,
422 items that are uniformly or frequently found include:

A. Household equipment

1. Buildings
2. Furniture
3. Bedding facilities
4. Kitchen accessories
5. Storing facilities
6. Lamps of various sizes
7. Ritual accessories

B. Farm equipment

1. Farm building: equipment and buffalo shed.
2. Implement: plow, harrow, yoke, roller, shovel, spade, hoe, weeding knife, noria, sickle, pitch-fork, rake, broom, winnowing machine, wooden winnowing spitula, basket, mat bin, box bin, home-mill.

7: Janlekha X-4,5 (1948-1953)p956 AO7 Central Thai AO7
Bangchan

[243] [434] [433] income and operator's labor earnings lies in the value of farm produce consumed by the family. Earlier, five kinds of produce were listed -- rice, fish, eggs, fruit and vege-[235] tables. For technical reasons, we consider only rice and eggs as products of the farm, rice being the primary crop [226] and eggs the secondary crop. Fish is not considered a farm product because Bangchan villagers fish for consumption, not for sale. Besides, fishing is done by every resident of the village, farmers and non-farmers alike. It is thus [244] [245] more of a way of life than an economic enterprise. The same is true for fruit and vegetable growing which is done in a very small scale.

If we agree on considering only rice and eggs as the products of the farm, it is not difficult to estimate the amount and value of farm produce consumed by the family for Bangchan operators can readily give a rather accurate information on their rates of consumption of these two products. Thus, under Bangchan condition the figure for operator's earnings is not as difficult to obtain as it appears to be the case among most American farms. The frequency distribution of operator's labor earnings of our 104 sample-farms is given in Table 48. It is seen that only 17 farms produced negative remuneration for the operator computed by this method as against 47 farms by the labor income method. As Professor Warren has said, of these two, labor earnings is a better [171] measure of profits. It is especially so in Bangchan and perhaps in other agricultural regions in Southeast Asia

[TEXT CONTINUED ON PAGE 306]

APPENDIX E

• 244

LIST OF VEGETABLES GROWN IN BANGCHAN

Thai name	English name	Season
Bawn	. . .	all year
Bua	Lotus	July - Dec.
Bua-bog	. . .	all year
Buab	Sponge gourd	Sept.- Dec.
Buab-liam	Towel gourd	May - Sept.
Chaploo*	Wild betel	all year
Faeng	Little gourd	Sept.- July
Fagthong	Pumpkin	Mar. - June
Horapa	Sweet basil	all year
Kaprao	Holy basil	all year
Khamin	Turmeric	all year
Khar	Galanga root	" "
Khileg	. . .	" "
Khing	Ginger root	" "
Krachai	. . .	" "
Makhua	Eggplant	" "
Man-musua	Yam	Oct. - Dec.
Man-samparang	Cassava	Mar. - April
Man-samrong	Bitter cassava	Mar. - April
Namtao	Bottle gourd	Aug. - Sept.
Oy	Sugar cane	Nov. - Mar.
Pag-bia*	Purslane	all year
Pag-bung*	Morning glory	" "
Pag-chee	Parsley	" "
Pag-kached	. . .	" "
Pag-khom*	Amaranth	Dec. - May
Pag-pangpuay*	Primrose willow	May - June
Pag-waen	Marsilea	July - Oct.
Prig-khinu	Bird pepper	all year
Sadao	. . .	Dec. - Feb.
Sano	. . .	Oct. - Dec.
Saranae	Peppermint	all year
Takrai	Lemon grass	" "
Tamlung	. . .	" "
Thonglang	. . .	Feb. - Mar.
Thua-fagyao	String bean	all year
Yod-khae	Kauri	April- May

(. . .) Not available.

* These plants grow wild in Bangchan.